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EXAMINER	
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2889	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/534,389	PULLINI ET AL.	
	Examiner	Art Unit	
	FATIMA N. FAROKHROOZ	2889	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _03 April 2009_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _29-41,43-54,59 and 60_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _29-41,43-54 and 59-60_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The amendment filed on 04/03/09 is acknowledged. Claims 29-41,43-54 and 59-60 remain pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 29-41,43-46,48-54,59-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Levinson (US 5152870) in view of Wuest (US 5416376), Richard (GB 2032173); Munroe (4499398) and Ooms (US 3956660).

Regarding Claim 29, Levinson teaches: An incandescence emitter for incandescence light sources (Fig. 1, 2, col.2, lines 50-55) comprising an emitter body to be brought to incandescence at an operating temperature by means of passage of electric current, wherein on at least one surface of the emitter body a micro-structure is provided (col.3, lines 30-40, also see col.3, lines 57-69 wherein the filament 2 in Fig. 1, 2 is made of tungsten).

Levinson does not teach that the emitter body (F) extending between two electrodes (H); the micro-structure (R) is at least partly made of a first material (Au) whose melting temperature is lower than the operating temperature of the emitter body (F) ; said electrodes (H) are made of a second material having a high melting point, such as tungsten, at least a substantial portion of the emitter body (F) , including said micro-structure is coated with a coating layer made of an oxide with high melting point such as a refractory oxide, said oxide being configured to preserve a profile of said microstructure (R) in case of melting of the first material (Au), consequent to the use of the emitter body (F) at an operating temperature exceeding the melting temperature of said first material (Au) and wherein at least one of said emitter body (F), said electrodes (H) and said coating laver (OR) includes one throat or cavity (G) being open on the first material (Au) for receiving part of said first material (Au) in case of melting thereof.

In the same field of endeavor of emitters, Wuest teaches an emitter (filament) made of gold plated tungsten (col.5, lines 10-15) in order to improve corrosion and oxidation resistance of the base element of tungsten.

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the emitter material, as disclosed by Wuest, in the device of Levinson in order to improve corrosion and oxidation resistance of the base element of tungsten.

Further, the above combination does not teach that at least a substantial portion of the emitter body (F) , including said micro-structure is coated with a coating layer made of an oxide with high melting point such as a refractory oxide, said oxide being configured to preserve a profile of said microstructure (R) in case of melting of the first material (Au), consequent to the use of the emitter body (F) at an operating temperature exceeding the melting temperature of said first material (Au).

In the same field of endeavor, the added Richard reference teaches an incandescent lamp filament that is coated with an oxide with high melting point (OR), such as a refractory oxide (see page 1, lines 30-60) in order to achieve **stability** at all temperatures at least up to the temperature attained by the filament in operation of the lamp (page 1, see **Abstract and page 1, lines 83-95**).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time of the invention, to add the emitter coating , as disclosed by Richard, in the emitter of the previous combination in order to achieve **stability** at all temperatures at least up to the temperature attained by the filament in operation of the lamp.

Further, the previous combination does not teach the emitter body (F) extending between two electrodes (H).

In the same field of endeavor, the added Munroe reference teaches an incandescent lamp emitter (filament 15; see Fig.8) extending between two electrodes E1 and E2 in order to energize the emitter (filament 15; col.5, lines 50-55).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to extend the emitter between two electrodes, as

disclosed by Munroe, in the emitter of the previous combination in order to energize the emitter.

Regarding the at least one of said emitter body (F), said electrodes (H) and said coating layer (OR) includes one throat or cavity (G) being open on the first material (Au) for receiving part of said first material (Au) in case of melting thereof; Ooms teaches a cavity 9 formed between the wire 7 and melting foil 3 (see at least Fig.2) in order to that the melting foil can flow at the end of the life of the lamp (see col.2,lines 45-50).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to add the cavity as disclosed by Ooms, to at least the emitter body, the electrode or the coating layer, of the previous combination in order that the melting metal from the emitter materials can flow in the cavity at the end of the life of the lamp.

Although the previous combination teaches that ***visible light*** is emitted by the emitter with improved efficiency (col.5; lines 43-48 of Levinson); the combined structure does not explicitly teach that the emitter is operative to enhance absorbance for wavelengths belonging to the visible region of the spectrum. However, since the claimed invention has the same structure as the ***combined structure*** of the previous combination, therefore function such as the emitter is operative to enhance absorbance for wavelengths belonging to the visible region of the spectrum is considered to be inherent and expected by the combination.

Regarding claim 51, the combined structure of Levinson (US 5152870) ; Wuest (US 5416376), Richard (GB 2032173); Munroe (4499398) and Ooms (US 3956660) teaches a method for constructing an incandescence light emitter to be brought to incandescence by passage of electric current comprising the steps of :obtaining a filiform or laminar emitter body (F) to be brought to incandescence at an operating temperature by means of passage of electric current, the emitter body (F) being formed to have on at least one surface thereof a micro-structure (R) operative to enhance absorbance for wavelengths belonging to the visible region of the spectrum (as disclosed by Levinson in claim 29) , said micro-structure (R) being at least partly made of a first material (Au; as disclosed by Wuest in claim 29) whose melting temperature is lower than the operating temperature of the emitter body (F),
b) obtaining a first and a second electrode (H). said electrodes (H) being made of a second material having a high melting point, such as tungsten, c) connecting each electrode (H) to the emitter body (F), and d) coating the emitter body (F) in which the anti-reflection micro-structure (R) has been formed with a coating layer (OR; as disclosed by Richard) of refractory, oxide, said coating layer (OR) being operative to preserve a profile of said microstructure (R) in case of melting of the material (Au) thereof consequent to the use of the emitter (F) at an operating temperature exceeding the melting temperature of said material (Au), the method including forming in at least one of said emitter body (F) said electrodes (H) and said coating layer (OR)

one throat or cavity (G) open on the first material (Au). See rejection in claim 29 above, the same reason to combine art as in claim 29 applies.

Regarding claim 30; the combined structure of the previous combination teaches an emitter, wherein said throat or cavity (G) is defined in at least one of said electrodes (H), at an interface region thereof between the first material (Au) and the second material (as disclosed by Ooms). See rejection in claim 29 above, the same reason to combine art as in claim 29 applies. Note: the location of the cavity applies to any one of the interfaces between the electrode, the refractory material or the emitter; in order to fulfill the same purpose of flowing of the melting material within the emitter in the cavity.

Regarding claim 31; the combined structure of the previous combination teaches an emitter, wherein the emitter body (F) is almost completely coated by said coating layer, with the exception of respective interface regions between the first material (Au) and the second material of said electrodes (See page 1; lines 45-50 of Richard wherein only the emitting body is coated with the refractory oxide on its surface. Also, see rejection in claim 29 above, the same reason to combine art as in claim 29 applies).

Regarding claim 32, the combined structure of the previous combination teaches an emitter, wherein said throat or cavity (G) is defined in said first layer (OR), at an interface region thereof between the first material (Au) and the oxide (as disclosed by Ooms). See rejection in claim 29 above, the same reason to combine art

as in claim 29 applies. Note: the location of the cavity applies to any one of the interfaces between the electrode, the refractory material or the emitter; in order to fulfill the same purpose of flowing of the melting material in the cavity as disclosed by Ooms.

Regarding claim 33, the combined structure of the previous combination teaches an emitter, wherein the material (Au) is selected among conductor, semiconductor and composite materials (material of gold as disclosed by Wuest).

Regarding claim 34, the combined structure of the previous combination teaches an emitter, wherein the emitter body (F) is formed by at least a first layer of conductor material (W), melting at higher temperature than the operating temperature of the emitter body (F), such as tungsten, and by a second layer made of the first material (Au) (as disclosed by Wuest) said second layer forming said micro-structure and said throat or cavity (G) is defined in the first layer, at an interface region between the conductor material (W) of the first layer and the first material (Au) of the second layer . Also, see rejection in claim 29 above, the same reason to combine art as in claim 29 applies.

Regarding claim 35, the combined structure of the previous combination teaches an emitter, wherein said micro-structure (R) is at least partly formed with **gold** (as disclosed by Wuest).

Regarding claim 36, Richard teaches an emitter, wherein said coating layer (OR) is made of a refractory oxide (OR) selected from among ceramic base oxides, thorium, zirconium oxide (see col.1,lines 50-60 of Richard; also see rejection in claim 29 above, the same reason to combine art as in claim 29 applies).

Regarding claim 37, Levinson teaches an emitter, wherein said micro-structure (R) is formed by a superficial micro-structure of the emitter body (F).

Regarding claim 38, the previous combination teaches an emitter, wherein said micro-structure comprises a diffraction grating (R), having at least one of a plurality of pillar micro-projections and a plurality of micro-cavities ;where the dimensions of the pillar like micro-projections or the micro-cavities and the period (P) of the grating (R) are such to enhance emission of visible electromagnetic radiation from the first material (R; **see col.5,lines 42-50 and col.3,line 58 to col.4;line 4** in Levinson), and/or reduce emission of infrared electromagnetic radiation from the first material, and/or enhance emission of the infrared electromagnetic radiation from the first material to a lesser extent with respect to the increase in visible emissivity.

Regarding claim 39, the previous combination teaches an emitter, wherein said grating (R) is obtained with a first layer of a conductor material (W) melting at higher temperature than the operating temperature of the emitter body (F), the conductor material of the first layer having a structured part, a second layer (disclosed by Wuest)

made of the first material which covers at least the structured part of said first layer (disclosed by Levinson), the first material (Au) being selected among conductor, semiconductor or composite materials ;where the second layer (Au) copies the profile of the structured part of the first layer, to form therewith said grating (R), and the first material (Au) has a greater emission efficiency (as disclosed by the same materials used in emitter of Wuest) than the conductor material (W) of the first layer, said efficiency being defined as the ratio between the fraction of visible radiation emitted at the operating temperature in the interval 380 nm-780 nm and the fraction of radiation emitted at the same temperature in the interval 780 nm-2300 nm (see rejection in claim 29 above, the same reason to combine art as in claim 29 applies; also see rejection in claim 32 and 34 above; Note: the same materials as disclosed by Wuest ; when used in the previous combination teaches the same inherent properties of emission efficiency and wavelengths as claimed).

Regarding claim 40, the previous combination teaches an emitter, wherein said grating (R) is obtained on the surface of a layer (Au) made of the first material (Au) ;said layer made of the first material (Au) is placed on a second conductor material (W) whose melting point is higher than the operating temperature of the emitter body (F; as disclosed by Wuest in order to resist corrosion of base material), where the first material (Au) has higher emission efficiency than the second conductor material (W; since the materials of gold and Tungsten of Wuest's filament are same as claimed), said efficiency being defined as the ratio between the fraction of visible radiation

emitted at the operating temperature in the interval 380 nm-780 nm and the fraction of radiation emitted at the same temperature in the interval 380 nm-2300 nm (see rejection in claim 29 above, the same reason to combine art as in claim 29 applies; also see rejection in claim 32).

As to the grounds of the rejection under section 103(a) with respect to claims 39 and 40, regarding the wavelengths and efficiencies which are considered to be the inherent characteristics of the device that meets the structural limitations as disclosed by the combined structure of the previous combination.

Regarding claim 41, the combined structure of the previous combination teaches an emitter, wherein said grating (R) is obtained with a first layer of refractory oxide (OR; as disclosed on col.5,lines 40-55 of Levinson wherein refractory materials are taught for emitters) having a structured part, a second layer (Au) made of the first material (Au) which covers at least the structured part of the first layer of refractory oxide (OR), the first material (Au; Gold emitting material as disclosed by Wuest) being selected among conductor, semiconductor or composite materials; where the second layer (Au) made of the first material (Au) copies the profile of the structured part of the first layer of refractory oxide to form therewith said grating (R), and where the second layer made of the first material (Au) is in turn coated by an encapsulating layer constituted by refractory oxide (OR) (see rejection in claim 29 above, the same reason to combine art as in claim 29 applies; also see rejection in claims 31 and **34 above**).

Regarding claim 43, Levinson teaches an emitter wherein the periodicity of the micro-projections (R1, R2) or of the micro-cavities (C) is of the order of the wavelength of visible radiation (see col.1, lines 55-65; see 0.15 and 0.35 micrometers; also see col.5, lines 26-42).

Regarding claim 44, Levinson teaches an emitter, wherein the periodicity of the micro-projections (R1, R2) or of the micro-cavities (C) is between 0.2 and 1 micron (see col.5, lines 26-42).

Regarding claim 45, Levinson teaches an emitter, wherein the height or depth of the micro-projections (R1, R2) or of the micro-cavities (C) is between 0.2 and 1 micron (see col.5, lines 26-42).

Regarding claim 46, Levinson teaches an emitter, wherein said micro-structure (R) is binary, i.e. with two levels (see Fig.1, 2; the two levels correspond to the top and bottom of height h in Fig.2).

Regarding claim 48, Levinson teaches an emitter wherein the micro-structure 5 (R) has a continuous projection (see projections 5 in Fig.2, col.3, lines 32-57 .Examiner Note: The examiner interprets continuous projection of the micro-structure as continuously projecting or going up continuously without any discontinuities (kinks) on the sides of the wall 5 in Fig.2).

Regarding claim 49, the previous combination teaches an emitter, wherein it operates at a lower temperature than the melting point of the refractory oxide (OR). *(Examiner Note: melting point properties for tungsten; gold and Refractory oxide disclosed by Levinson, Wuest and Richard, respectively is implied and inherent).* Also see rejection in claim 29 above, the same reason to combine art as in claim 29 applies.

Regarding claim 50, Levinson teaches an emitter, wherein it is configured as a filament or planar plate structured under the wavelength of visible light (Fig.1, col. 3,lines 32-57,also see rejection in claim 32 and col.5,lines 42-60), and in that said micro-structure (R) is a two-dimensional grating of absorbing material (k>1; col.5,lines 15-60 and 43-60; see 5 in Fig.3E wherein the material is listed in col.5,lines 42-60).

Regarding claim 52, the previous combination teaches a method wherein a step b) comprises forming said throat or cavity (G; disclosed by Ohms between two interfaces in the field of emitters wherein one material melts in the gap) in at least one of said electrodes (H), and- step c) comprises connecting said one electrode (H) and said body (F) such that at an interface region between the first material (Au) and the second material said throat or cavity (G) is open on the first material (Au). See rejection in claim 29 above, the same reason to combine art as in claim 29 applies.

Further since the cavity formed between two metal interfaces in an emitter configuration wherein the hot metal melts and fills gap of cavity is already disclosed by

Ooms, therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to form the cavity in at least the emitter body, the electrode or the coating layer, of the previous combination in order that the melting metal from the emitter materials can flow in the cavity.

Regarding claim 53, the previous combination teaches a method wherein step d) comprises forming said throat or cavity (G) in said coating layer (OR) such that at an interface region between the first material (Au) and the refractory oxide said throat or cavity (G) is open on the first material (Au). See rejection in claim 29 above. The same reason to combine art as in claim 29 applies wherein the method of constructing the emitter results in the emitter structure of claim 29. Also see rejection in claim 53 above.

Regarding claim 54, the previous combination teaches an incandescent light emitter body, brought to incandescence by the passage of electric current. (see rejection in claim 29 above. The same reason to combine art as in claim 29 applies).

Regarding claim 59, the previous combination teaches a method, wherein step a) comprises- forming the emitter body (F) by at least a first layer of conductor material (W), melting at higher temperature than the operating temperature of the emitter body (F), such as tungsten (as disclosed by Wuest), and by a second layer made of the first material (Au), and - defining said throat or cavity (G) in said first layer of conductor material (W) such that at an interface region between the first material (Au) and the

conductor material (W) said throat or cavity is open on the first material (Au).See rejection in claim 59 above. The same reason to combine art as in claim 29 applies. Also see rejection in claim 53 above.

Regarding claim 60, the previous combination teaches an incandescence emitter for incandescence light sources, comprising an emitter body (F) to be brought to incandescence at an operating temperature by means of passage of electric current, wherein on at least one surface of the emitter body (F) a micro-structure (R) is provided, operative to enhance absorbance for wavelengths belonging to the visible region of the spectrum, wherein - said micro-structure (R) is at least partly made of a material (Au) whose melting temperature is lower than the operating temperature of the emitter body (F), and - at least a substantial portion of the emitter body (F), including said micro-structure (R), is coated with an oxide with high melting point (OR), such as a refractory oxide, said oxide being configured to preserve a profile of said microstructure (R) in case of melting of the respective material (Au), consequent to the use of the emitter body (F) at an operating temperature exceeding the melting temperature of said material (Au). See rejection in claim 29 above. The same reason to combine art as in claim 29 applies.

Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Levinson (US 5152870), Wuest (US 5416376), Richard (GB 2032173); Munroe (4499398) and Ooms (US 3956660); further in view of Gee et al (US 20030132705).

Regarding Claim 47, the previous combination teaches the invention set forth above (see rejection in Claim 29 above). The combination is silent regarding an emitter, wherein said micro-structure (R) is multi-level, i.e. it has a projection with more than two levels.

In the same field of endeavor of emitters for incandescent lamps, the added Gee reference teaches an emitter wherein the micro-structure (R) is multi-level, i.e. it has a projection with more than two levels (see stacked tungsten rods 370 in Fig. 3i ;also see [0009],[0014]-[0018],[0023],[0027],[0029],[0036]-[0040]) in order to selectively emit thermal radiation in the visible and near-infrared portions of the spectrum thereby enabling a more efficient incandescent lamp ([0009]).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify the emitter as disclosed by Gee, in the device of the previous combination in order to selectively emit thermal radiation in the visible and near-infrared portions of the spectrum thereby enabling a more efficient incandescent lamp.

Prior Art

US 4393817 teaches that gold is plated over tungsten wire in order to achieve corrosion resistance in high temperatures.

Response to Arguments

The arguments filed on 04/02/08 are acknowledged but are moot in view of new grounds of rejection for the amended claims.

Conclusion

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fatima Farokhrooz whose telephone number is (571)-272-6043. The examiner can normally be reached on Monday- Friday, 9 am - 5 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minh-Toan Ton can be reached on (571) 272-2303. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Fatima N Farokhrooz/
Examiner, Art Unit 2889/

/Joseph L. Williams/
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